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SCULLY SCOTT MURPHY & PRESSER, PC
400 GARDEN CITY PLAZA
SUITE 300
GARDEN CITY, NY 11530

EXAMINER	
DUONG, THOI V	

ART UNIT	PAPER NUMBER
2871	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/726,942	LU, MINHUA	
	Examiner	Art Unit	
	Thoi V. Duong	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1203*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 11 is objected to because of the following informalities: claim 11 recites the limitation "the discrete spacer posts or balls" in line 1. There is insufficient antecedent basis for this limitation in the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 5, 9, 12-14, 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sojourner et al. (Sojourner, USPN 6,750,939 B2) in view of Lee (USPN 6,844,911 B2).

Re claims 1 and 12, as shown in Fig. 4, Sojourner discloses a method (as well as an arragenent) for the spacerless filling of liquid crystals to form liquid crystal cells on a silicon backplane 21 or microdisplays, said method comprising (col. 3, lines 44-67):

forming spacer walls 23 on said silicon backplane 21 (silicon wafer) to provide a plurality of cells surrounding active liquid crystal display areas 30;

laminating a top layer material 26 (glass wafer) to said silicon backplane 21;

dispensing into each of said active liquid crystal display areas 8 within spacer walls 11 with an exact amount of liquid crystals; and

dicing said silicon backplane 21 along scribe lines 36 to form individual liquid crystal cells 23 (col. 4, lines 8-11).

Sojourner discloses a method for the spacerless filling of liquid crystals to form liquid crystal cells on a silicon backplane 9 or microdisplays that is basically the same as that recited in claims 1 and 12 except for introducing a curable sealant into gaps externally of said spacer walls.

As shown in Figs. 3 and 4, Lee discloses a method for fabricating liquid crystal cells comprising

introducing a curable sealant (dummy seal pattern 74) into gaps 64 externally of spacer walls 72 (col. 2, lines 54-60); and

curing said sealant and dicing glass substrate 60 through said gaps 64 so as to form individual liquid crystal-filled cells (col. 3, lines 12-23 and col. 6, lines 40-43),

wherein, re claims 9 and 20, as shown in Fig. 1, the surfaces of substrates 10 and 30 are each provided with a layer of an alignment material 18 and 48 for aligning liquid crystal layer 50 (col. 1, lines 63-65 and col. 2, lines 5-11).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Sojourner with the teaching of Lee by introducing a curable sealant into gaps externally of the spacer walls for not only protecting said spacer walls but also preventing a breakdown of the glass substrate during cutting process (col. 3, line 67 through col. 4, line 4).

Re claims 2 and 13, Sojourner discloses that the silicon backplane comprises a semiconductor wafer having said liquid crystal cells formed thereon in a closely spaced array (col. 1, lines 31-67 and col. 3, lines 12-25),

wherein, re claims 3 and 14, the spacer walls 23 are configured to form essentially rectangular liquid crystal cells (Fig. 4).

Re claims 5 and 16, Sojourner discloses that the top layer material comprises a glass window 26 of a size commensurate with the size of said silicon backplane 21 as shown in Fig. 4.

4. Claims 7, 11, 18 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sojourner et al. (Sojourner, USPN 6,750,939 B2) in view of Lee (USPN 6,844,911 B2) as applied to claims 1-3, 5, 9, 12-14, 16 and 20 above and further in view of Lovas et al. (Lovas, USPN 6,126,768).

The method of Sojourner as modified in view of Lee above includes all that is recited in claims 7, 11, 18 and 22 except for arranging discrete spacer posts or balls in the areas containing said sealant so as to mechanically strengthen said liquid crystal displays, and selectively applying pressure to said spacer walls during introduction of said sealant into said gaps so as to facilitate control over the uniformity of said gaps about the liquid crystal cells and to provide a support for the silicon backplane during the assembly of said cells.

Lovas discloses a method of assembling a liquid crystal display, wherein a plurality of spacers are positioned in the areas containing sealing member, and wherein pressure is applied to a frame, which is positioned externally to each substrate and

aligned with the seal member so that a region corresponding to a display area is substantially pressure-free, and a uniform cell gap is obtained (Specification, paragraph 8).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the method of Sojourner with the teaching of Lovas by arranging discrete spacer posts or balls in the areas containing the sealant and selectively applying pressure to the spacer walls during introduction of said sealant into said gaps so as to obtain a display area with substantially pressure-free and a uniform cell gap (Specification, paragraph 8).

5. Claims 4, 7, 8, 15, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sojourner et al. (Sojourner, USPN 6,750,939 B2) in view of Lee (USPN 6,844,911 B2) as applied to claims 1-3, 5, 9, 12-14, 16 and 20 above and further in view of Liao et al. (Liao, USPN 6,681,005 B2)

The method of Sojourner as modified in view of Lee above includes all that is recited in claims 4, 7, 8, 15, 18 and 19 except for the cell size, the thickness of the spacer walls, and a selective pressure applied to said spacer walls during introduction of said sealant into said gaps so as to facilitate control over the uniformity of said gaps about the liquid crystal cells and to provide a support for the silicon backplane during the assembly of said cells.

Re claims 4 and 15, Liao discloses a LCOS panel consisting of a glass substrate 102 and a silicon substrate, wherein the LCOS panel has a general panel size of 0.7 inch (17.5 mm), 0.9 inch (22.5 mm) or 1.3 inch (32.5 mm) (col. 2, lines 4-27).

Re claims 7 and 18, as shown in Figs. 6-8, Liao discloses a process for forming a uniform cell gap, wherein a local pressure is applied to a spacer wall 606 from a hot press apparatus including hot plates 702, 704 and cushions 706, 708 (col. 5, line 36 through col. 6, line 20),

wherein, re claims 8 and 19, the uniform cell gap is approximately 15-20 micrometer (col. 5, lines 39-42). Accordingly, the spacer wall 606 also has the same thickness as the cell gap.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the method of Sojourner with the teaching of Liao by applying selective pressure to said spacer walls during introduction of said sealant into said gaps so as to facilitate control over the uniformity of said gaps about the liquid crystal cells and to provide a support for the silicon backplane during the assembly of said cells (col. 5, line 36 through col. 6, line 20).

6. Claims 6 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sojourner et al. (Sojourner, USPN 6,750,939 B2) in view of Lee (USPN 6,844,911 B2) as applied to claims 1-3, 5, 9, 12-14, 16 and 20 above and further in view of Cohn (Pub. No. US 2002/0179921 A1).

The method of Sojourner as modified in view of Lee above includes all that is recited in claims 6 and 17 except for the spacer walls being formed lithographically on the silicon substrate. However, the lithographical process for forming sealant structures (spacer walls) on the silicon substrate is well known in the art as disclosed by Cohn to seal two substrate together (page 3, paragraphs 11 and 53).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to lithographically form the spacer walls on the silicon substrate as taught by Cohn to improve seal reliability and performance (paragraph 62).

7. Claims 10 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sojourner et al. (Sojourner, USPN 6,750,939 B2) in view of Lee (USPN 6,844,911 B2) as applied to claims 1-3, 5, 9, 12-14, 16 and 20 above and further in view of Brosig et al. (Brosig, USPN 5,106,441).

The method of Sojourner as modified in view of Lee above includes all that is recited in claims 10 and 21 except for the dispensing of said liquid crystals and sealant and lamination being implemented under a vacuum.

Brosig discloses a process for manufacturing a liquid crystal cell comprising implementing the dispensing of said liquid crystals and sealant and lamination under a vacuum (col. 1, line 60 through col. 2, line 15).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the method of Sojourner with the teaching of Brosig by implementing the dispensing of liquid crystal and sealant and lamination under a vacuum to eliminate the evacuation time and obtain a stable cell (col. 1, lines 53-57 and col. 2, lines 12-13).

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (571) 272-

2292. The examiner can normally be reached on Monday-Friday from 8:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached at (571) 272-2293.

Thoi Duong

04/03/2005

ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800